

The Consortium for Building Energy Innovation

CBEI is focused on generating impact in the small and medium-sized commercial buildings (SMSCB) retrofit market. CBEI is comprised of 14 organizations including major research universities, global industrial firms, and national laboratories from across the United States who collaborate to develop and demonstrate solutions for 50% energy reduction in existing buildings by 2030. The CBEI FINDINGS series highlights important and actionable technical, application, operation and policy research results that will accelerate energy efficiency retrofits when applied by various market participants. CBEI views these FINDINGS as a portal for stakeholders to access resources and/or expertise to implement change.

Benchmarking and Disclosure

Buildings account for 40 percent of the nation's energy use and for 38 percent of total US CO₂ emissions in 2013. Roughly half of these emissions were attributable to the commercial building sector. In many jurisdictions, building codes require minimum levels of energy efficiency in new buildings, but there are few policies directed at older buildings.

Designing policies to stimulate energy efficiency retrofits and improvements to existing buildings is difficult. One popular new policy that has been adopted in ten U.S. Cities is a requirement that building owners disclose their annual energy use and benchmark it relative to other buildings. As of December 2014, the cities of Austin, Boston, Cambridge, Chicago, District of Columbia, Minneapolis, New York City, Philadelphia, San Francisco, and Seattle have all passed local benchmarking and disclosure ordinances as had Montgomery County, Maryland, the states of California and Oregon.

The underlying principle of these policy programs is that publicizing building energy efficiency will provide valuable information to potential renters, buyers, and financiers. Policy makers believe that as the data accuracy is tested and proven accurate, building energy efficiency data will become an integral part of the financial decision making process with respect to building leasing, ownership, and financing.

A key element underpinning building the success of benchmarking and disclosure ordinances is consistency and accuracy of data.

Research Finding: Benchmarking, Disclosure and Market Transparency

Mandatory commercial building rating and disclosure policies, which require the energy performance of buildings to be measured and disclosed, have the potential to transform the real estate sector. These policies could drive demand for and investment in strategies and technologies that reduce energy use in buildings. Transparent energy performance data can potentially influence the decisions made by businesses, tenants, investors, lenders and building owners and operators.

The U.S. EPA, which administers the ENERGY STAR Portfolio Manager tool, has played an instrumental role in supporting the work of implementing city and state Benchmarking programs by helping to identify and meet needs related to the Portfolio Manager tool.

CBEI has identified the importance of well trained professionals to input building level energy and physical data into Portfolio Manager to optimize the results of Benchmarking and Disclosure ordinances.

CBEI has developed an online training and certification program aimed at providing the necessary level of proficiency in assuring the building level data is correctly entered into Portfolio Manager.

Benchmarking, Disclosure and Market Transparency

Benchmarking is the practice of comparing the measured performance of a device, process, facility, or organization to itself, its peers, or established norms with the goal of informing and motivating performance improvement. When applied to building energy use, benchmarking serves as a mechanism to measure the energy performance of a single building over time, relative to other similar buildings, or to a simulated reference building based on a specific standard.

Benchmarking and disclosure programs may lead to reductions in energy use and emissions, if building owners know their energy costs, if tenants prefer to lease space in more efficient buildings, and if benchmarking and disclosure programs have an effect on commercial building investors.

Currently ten cities, one county and two states have adopted a form of commercial building benchmarking and/or disclosure. (see map above)

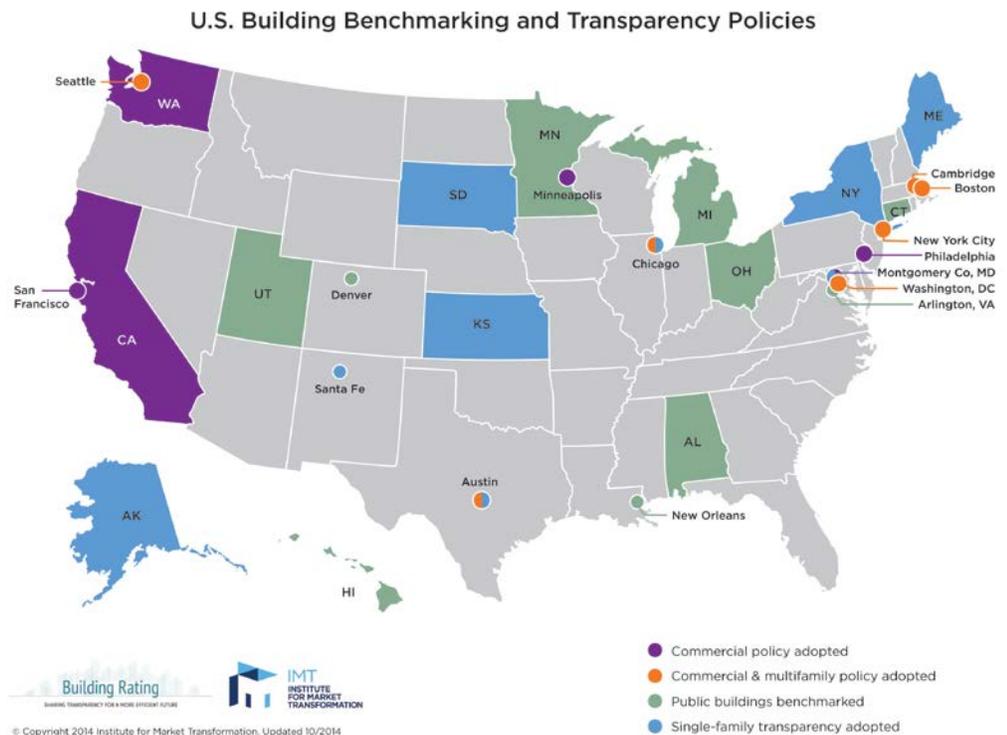
These public policy efforts are too new to measure their efficacy; however, proponents believe that transparent building performance information is expected to drive the real estate market toward greater energy efficiency, without explicitly requiring that retrofit improvements be made.

With building energy benchmarking and disclosure requirements just now coming into effect in a number of cities and states, experience from these programs may provide valuable insights in the future into whether these types of requirements are an effective approach to addressing market and behavioral failures that can limit cost-effective energy efficiency investments.

A growing body of experience demonstrates a link between benchmarking, customer participation in utility programs, and energy performance improvements suggesting strongly that owners and operators who benchmark their buildings are more likely to pursue and achieve energy savings than those who do not benchmark.

To this end, the National Association of Regulatory Utility Commissioners (NARUC) has recognized the value of benchmarking for energy and demand reduction, increased cost-effectiveness in utility program portfolios, cost savings for customers, and system-wide benefits.

CBEI's experience in benchmarking and disclosure data analytics provides a clear understanding that the underpinning of these efforts relies on quality data. To improve benchmarking data quality, CBEI, in collaboration with New Jersey Institute of Technology, U.S. DOE, U.S. EPA and NRDC, launched the Certificate of Proficiency in Benchmarking® program in November of 2014. This program seeks to educate and certify professionals who can assist these programs to deliver quality data for market participants and assure that good energy decisions can be made by the market participants.



The Certificate of Proficiency in Benchmarking® Program

The Certificate of Proficiency in Benchmarking® training program is free. This online interactive course consists of four distinct modules that teach users how to effectively collect benchmarking information and use the U.S. EPA's free, online ENERGY STAR Portfolio Manager® Tool. Each module is approximately one hour long.

Portfolio Manager 101

Portfolio Manager 101 is an introduction to the ENERGY STAR Portfolio Manager tool. This lesson shows participants:

- How to navigate Portfolio Manager
- How to add a single property and enter details
- How to enter energy and water consumption data

Portfolio Manager 201

Portfolio Manager 201 demonstrates for participants how to use some of the more advanced features of Portfolio Manager including:

- Editing existing property information
- Correcting and updating historical information
- Using baselines and goals

Portfolio Manager 301

The intention of Portfolio Manager 301 is to address the current quality assurance/quality control issues. This includes:

- Addressing areas of confusion for the average user
- Providing answers to frequently asked questions
- Benchmarking a portfolio of buildings

Portfolio Manager 401

Engaging the student in a lesson where they can use their knowledge from the previous 3 lessons, Portfolio Manager 401 will walk students through the process of actually entering the data into Portfolio Manager.

Students will:

- Register for an account on Portfolio Manager and create a building profile, based on a sample building
- Convert sample data and enter it into Portfolio Manager

Certification

The Certificate of Proficiency in Benchmarking® exam¹ is comprised of 40 randomly delivered multiple choice questions and must be completed within 90 minutes. Candidates will need to score a minimum of 80%. Candidates who score lower than an 80% will have the opportunity to re-attempt the exam two additional times (for a maximum of three attempts). There is a 24-hour waiting period before the exam may be re-attempted. If candidates fail to pass the exam after three attempts, they will be required to complete the four training modules and pay to take the exam again.

Upon successful completion a Certificate of Proficiency in Benchmarking® will be issued. The certificate will have a unique identification number that can be used to distinguish a certified benchmarking professional in the ENERGY STAR Portfolio Manager™ and local disclosure compliance documents. Certified Benchmarking® information and certificate numbers will be made publicly available on a database of certified benchmarkers.

The Certificate of Proficiency in Benchmarking® is good for 2 years. Certificate holders will be required to complete a single training module and exam to renew the certificate every two years. The purpose of renewal is primarily to train on any updates to the ENERGY STAR Portfolio Manager™ tool and address common benchmarking issues.

¹ The exam is \$125 for (up to) three exam attempts and 2-year certification period.

Lessons Learned for Benchmarking

Data quality is an important issue: CBEI provided data analytics to the City of Philadelphia in assessing their first and second year of data collection. For example, of the 755 Portfolio Manager Energy Star score eligible properties submitted during the first year of compliance, 128 properties (17%) did not receive a score. Although the reason(s) an eligible property did not receive a score varied from property to property, six main data quality/accuracy issues were identified:

- 25% or more of gross floor area was associated with a non-eligible space use type;
- Building/space details were not defined for the whole 2012 calendar year, e.g., the number of workers was not defined throughout 2012;
- Certain input values were not within range, e.g., weekly operating hours were too low;
- Energy use meters did not have monthly data for all of 2012;
- Energy use meters did not account for all energy usage of property;
- Source EUI was determined to be out of range.

Uncertainty in square footage of property: Since the Energy Utilization Index (EUI) depends on a property's square footage, inaccuracies in this number can have a large impact on the associated Portfolio Manager score.

Default values used in PM: In many cases, if a building characteristic is not known, a Portfolio Manager user can elect to use a predefined default value in order to get an Energy Star score.

Estimated meter readings: In order to calculate an accurate EUI, actual building energy use should be reported. Portfolio Manager allows the use of estimate readings when entering meter data.

Moving Forward

The Certificate of Proficiency in Benchmarking® is a certificate program that recognizes successful completion of online-based training modules and proven minimum competencies in the use of the U.S. Environmental Protection Agency's ENERGY STAR Portfolio Manager® tool.

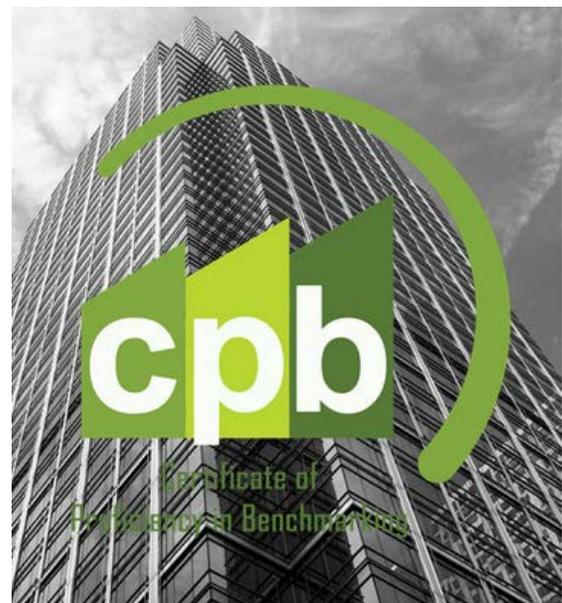
The certificate program was launched in the Fall of 2014 and can be found at:

<http://www.benchmarkingcertificate.org/>

CBEI intends to promote the use of the site through targeted promotion among the following stakeholders:

Existing Benchmarking Jurisdictions
 Development Partners (DOE, EPA and NDRC)
 Supporters like Institute for Market Transformation
 Associations (ASHRAE, BOMA)
 Real Estate Roundtable
 Utilities including NARUC

CBEI will develop a technical whitepaper showing the need for building level training to improve the accuracy of Benchmarking results.



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CBEI is a research and demonstration center that works in close partnership with DOE's Building Technologies Office.